

Presents

International Conference on
GREEN & SUSTAINABLE IRON MAKING

January 17 – 18, 2024



FOCUSING ON SUSTAINABILITY



KROSAKI

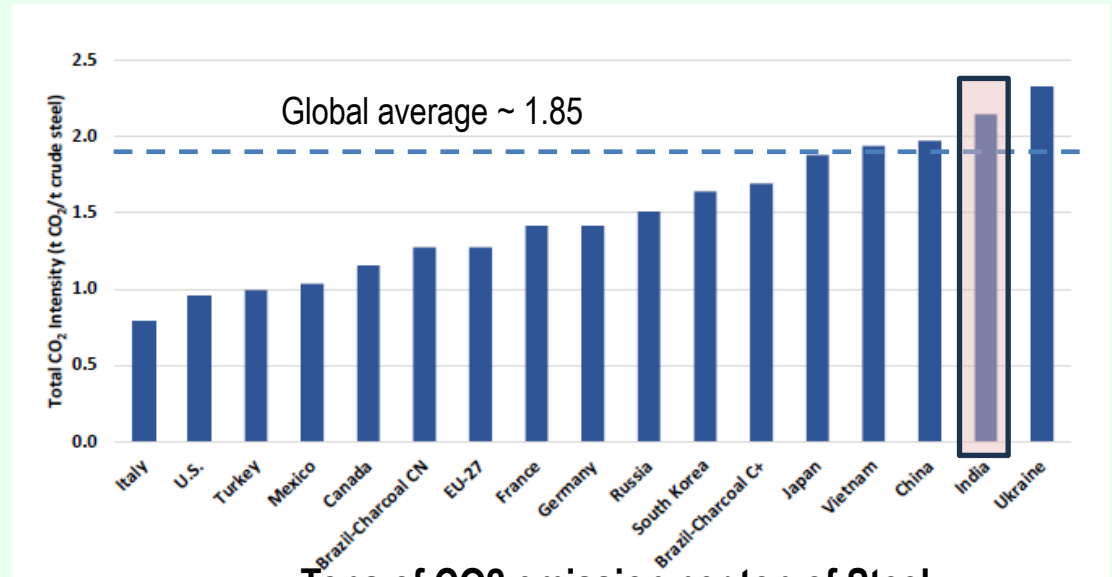
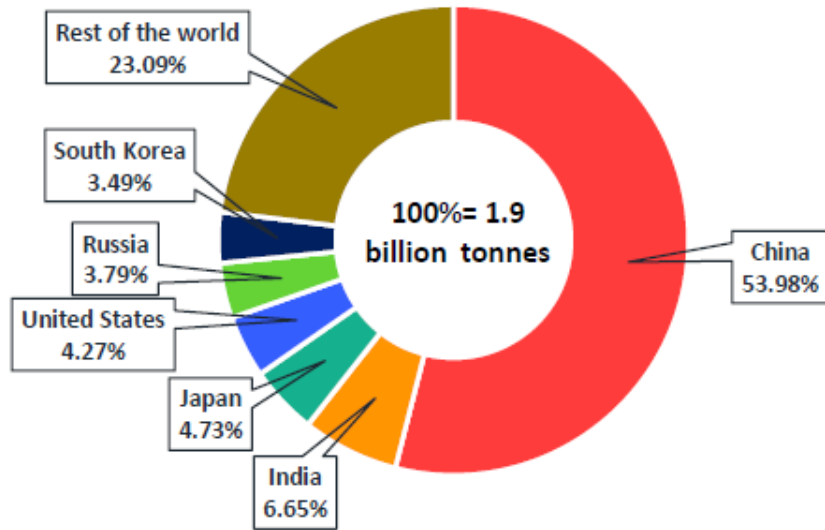
GREEN REFRACTORIES SOLUTION



**TRL KROSAKI INITIATIVES TOWARDS
GREENER ENVIRONMENT**

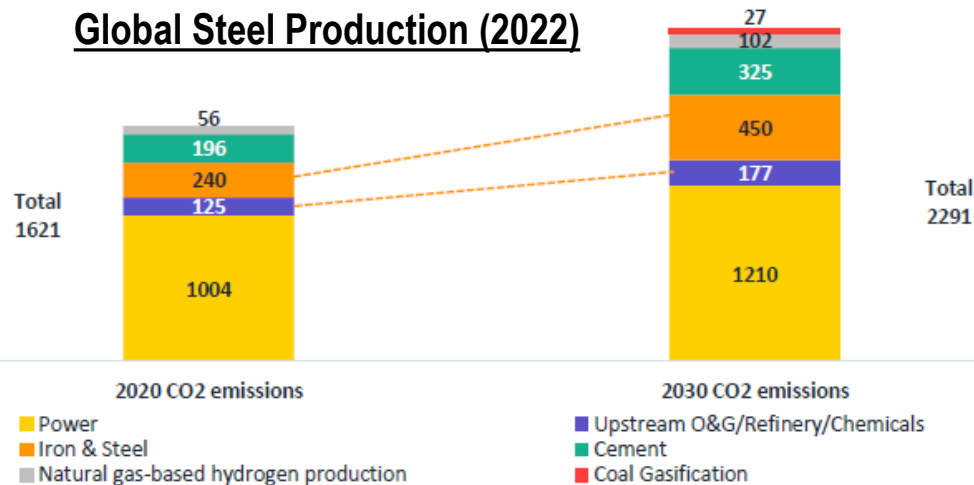


Back-Ground



Tons of CO2 emission per ton of Steel production in major steel producers

Global Steel Production (2022)



Total CO2 emission & projection in India (in MTPA)

Source: NITI Aayog

TRL Krosaki, as a partner to Indian Steel industry is contributing to Greener environment by –

- Sustainable actions at its manufacturing plants
- Promote products & services which help to reduce the emission

TRL Krosaki Approach

- Energy Saving Refractory
- Non-Hazardous Refractory
- High Performance Refractories

- Environment friendly Binders
- Materials with Reduced Carbon Footprint

- Renewable Energy Adoption
- Carbon Capture & Utilization (CCU)
- Sustainable Production
- Circular Economic Approach
- Lifecycle Assessment & Eco-design

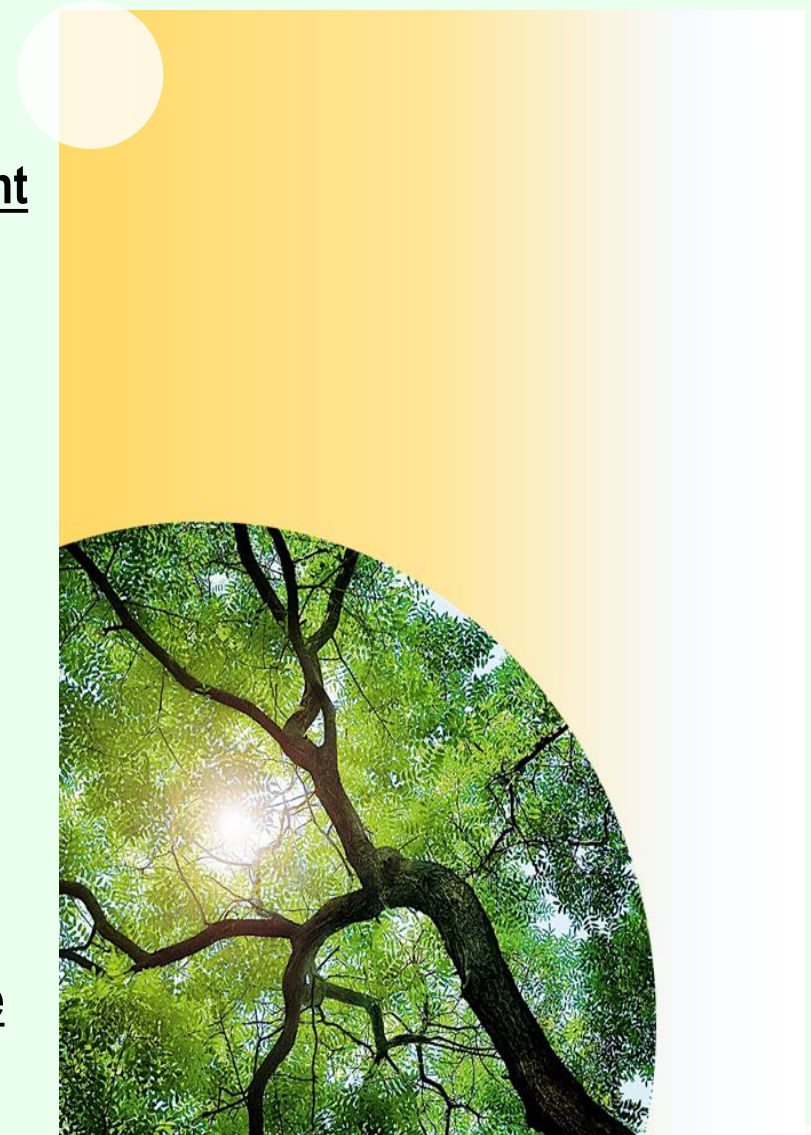
- Refractory Installation Efficiency

Product Development

Raw Material

Manufacturing Process

Application Service



Environment Friendly Tap Hole Clay

Feature of newly developed taphole clay

- ✓ PAHs free (*As binder) ✓ Formaldehyde free
- ✓ Free-phenol <1% (Odor less) ✓ Good plugging texture without crack
- ✓ Easy handling (less sensitive to heat)




	Cut section of samples	Image analysis
Coal tar		Crack area 2.9%
Conventional resin		Crack area 9.3%
Developed resin		Crack area 2.2%

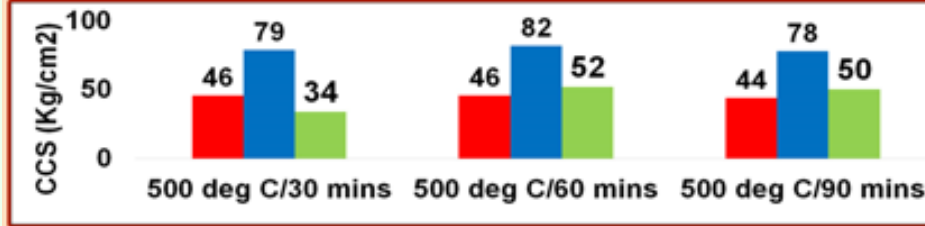
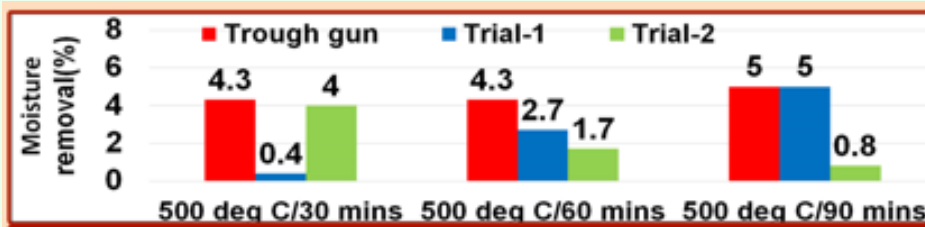
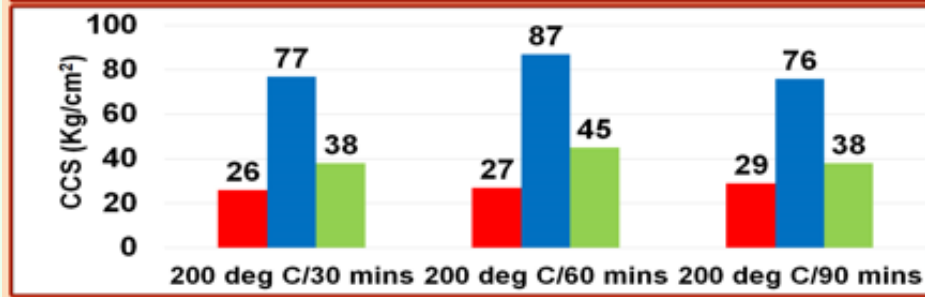
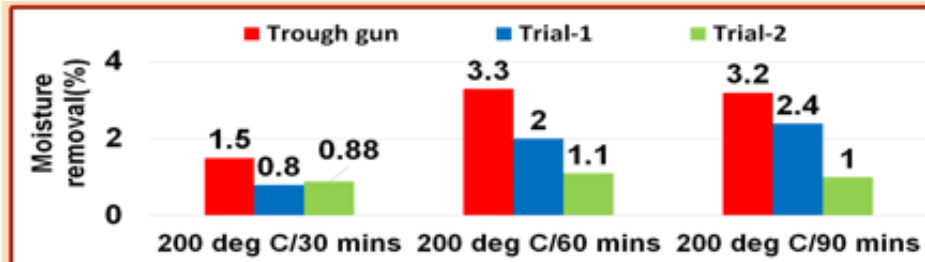
Figure 2 Plugging test

Table 1 Properties

Binder property	Coal tar	Conventional resin binder	Developed resin binder
Carcinogen / ppm (Benzo[a]pyrene)	7000	Free	Free
Free phenol / %	—	>1%	<1%
Odor / ppm (Vaporized phenol)	—	>25	Free
Taphole clay property	Coal tar	Conventional resin binder	Developed resin binder
Plugging	++++	+	+++
Taphole depth	+++	++	+++
Tapping time	+++	++	+++
Handring	++++	+	+++
Rapid hardening	+	++++	+++

The product is in use in 5400 cu m furnace in Japan

Environment Friendly Monolithic for BF Troughs



Purpose –

1. Reduce dry out requirement to the minimum
2. Faster installation during repairing

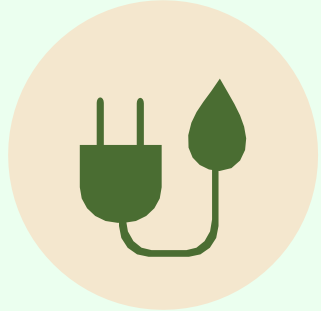
Status -

- TRL Trough gun & TRL Trough gun CCA (Trial -1) variety is in use on regular basis
- The castable variety is under final testing at our R&D



Efforts at manufacturing plant in Belpahar, Odisha

ENERGY

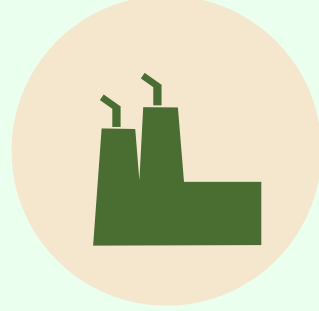


Sp. Energy Consumption
Gal/MT

10% less in last 5 yrs.

- Inefficient thermal units replaced
- Automation
- Efficiency improvement
- Energy Audit

EMISSION

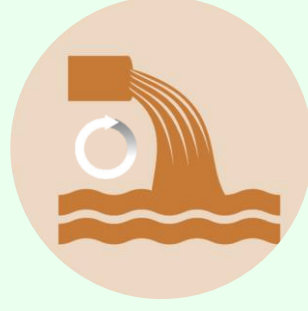


Sp. CO₂ Emission
Tons CO₂/MT

12% less in last 5 yrs.

- Reduced Fuel consumption
- Low / no carbon Product
- Efficiency improvement
- Yield improvement

WATER



Sp. Water Consumption
(Plant) – KL/MT

21% less in last 5 yrs.

- Use of recycled water maximized
- “Zero” discharge from plant
- Water Audit
- Creation of Water Bodies (3 nos.)

WASTE



Total Reprocessed
Material cons. (MT)

32% more in last 3 yrs.

- Enhanced focus on recycling
- Processing units set up
- Focused lab. Studies
- Helps in reducing CO₂ emission

GREENERY

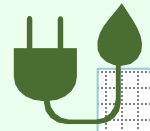


Greenbelt Coverage
No. of trees planted

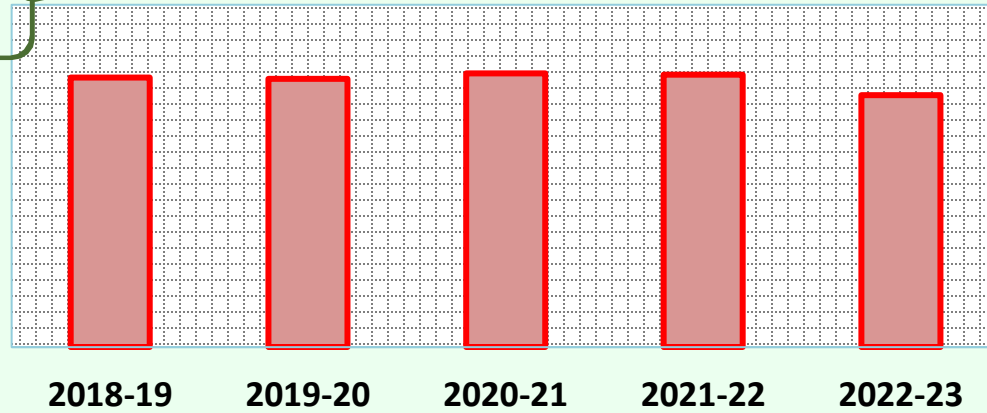
> 10,000 in last 5 yrs.

- Planted > 2.5 L trees
- Biodiversity focus
- Env. Friendly species

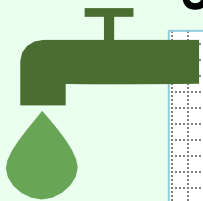
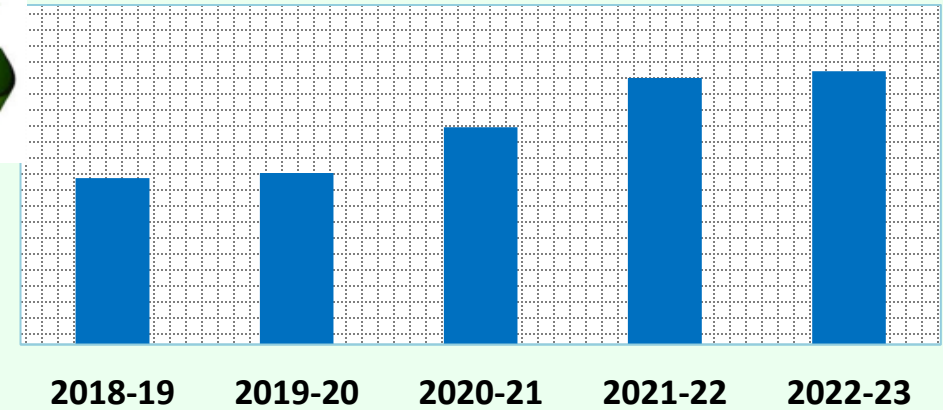
Environmental Sustainability : Key Indicators



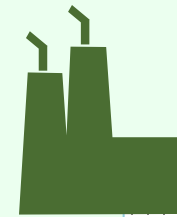
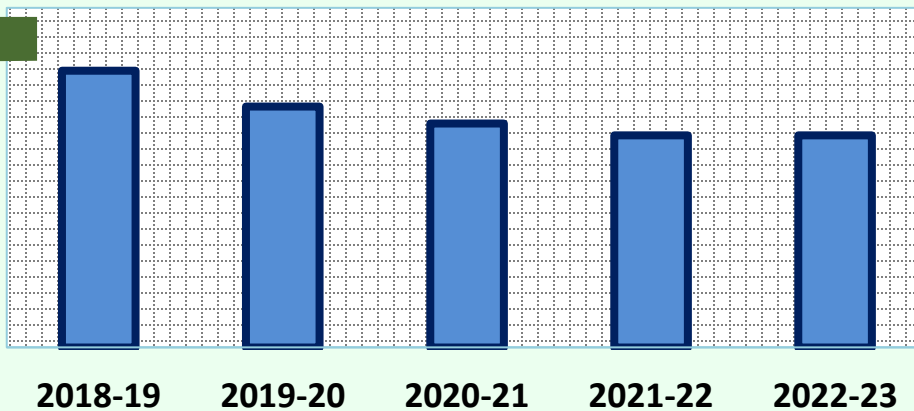
Sp. Energy Consumption [Gcal/MT]



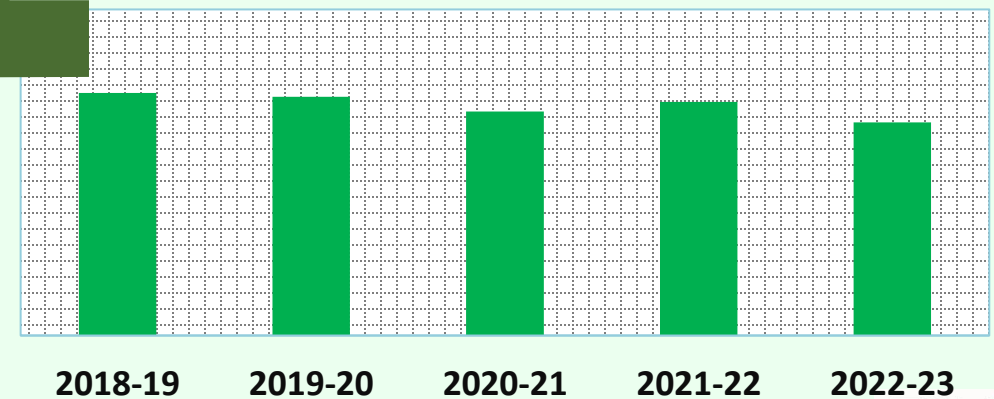
Sp. Consumption of Recycled Materials (Kg/MT)



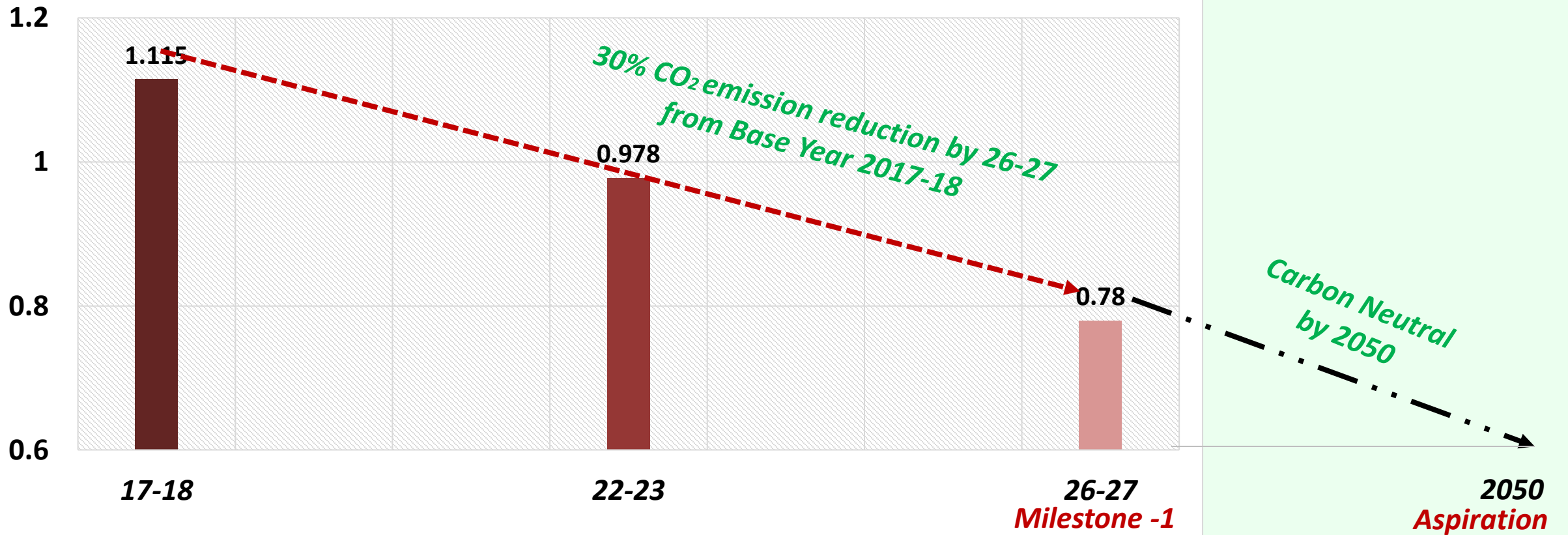
Sp. Fresh Water Consumption [KL/MT]



CO₂ Generation [Ton of CO₂/MT]



TON CO₂/ TON of Product



Recycling of used refractory



- ✓ Total Capacity for Processing of muck : 10,000 MT/ (5,000 MT/Month from each of 2 units)
- ✓ Plan to create few more Recycling Centers pan India



Environmental Sustainability Roadmap

Bio-Diversity

- ✓ **Additional 10,000 plantation** to existing cumulative plantation of 2.5 Lakhs

Emission

- ✓ **Complete mapping of GHG Emissions** and specific Action Plans based on findings
- ✓ Life Cycle Assessment of key refractories products

Energy

- ✓ **Complete substitution of Furnace Oil / Coal by Natural Gas**
- ✓ **Renewable Energy to substitute 12% of total Electrical Energy**

FY 26-27

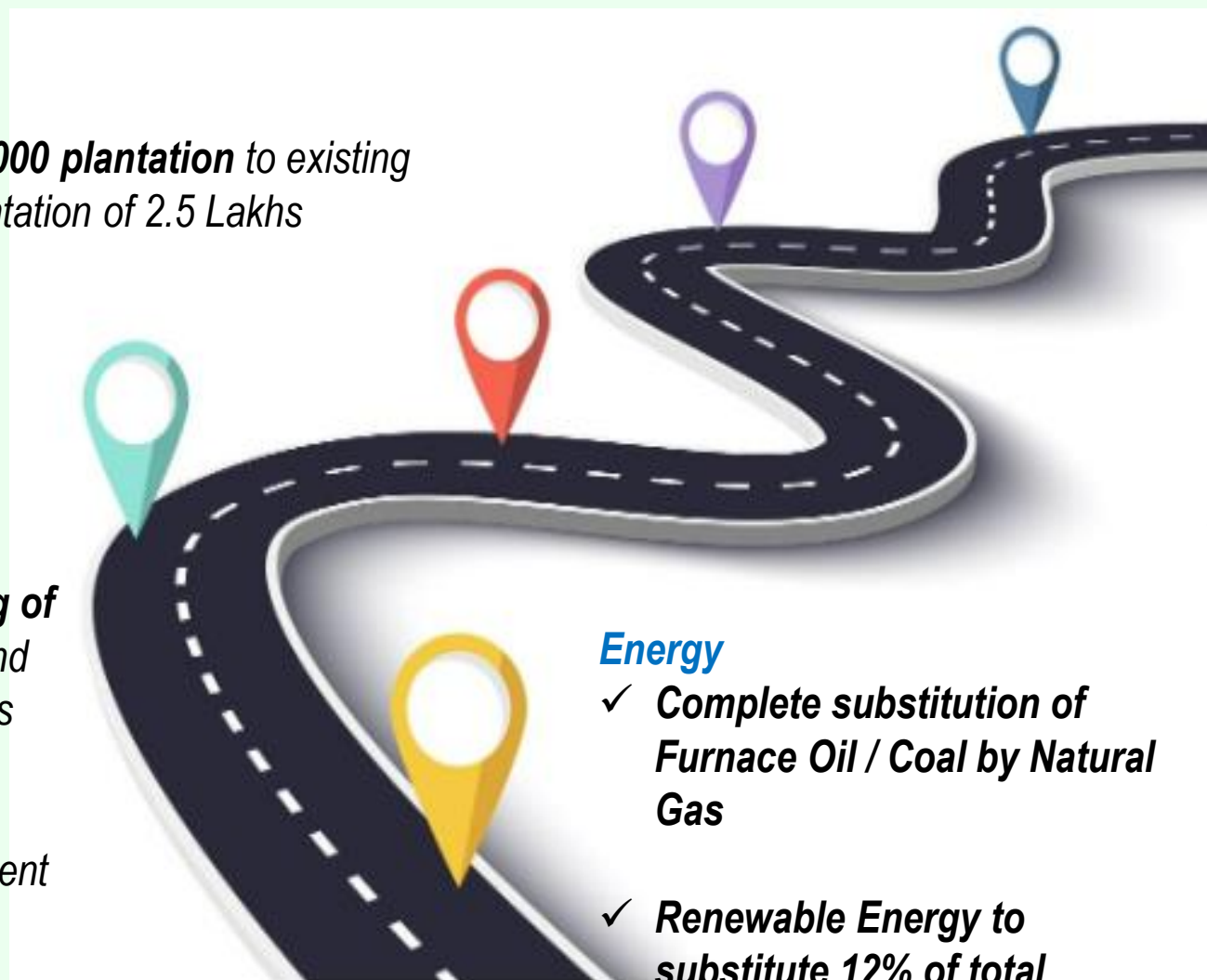
Waste & Recycle

- ✓ Enhance reprocessing capacity & capability to achieve **reprocessed material usage from 16% to 25%**

Product Sustainability

- ✓ Use of Nano carbon to **reduce graphite content** with similar properties
- ✓ Use of **Environment friendly Green binder** in Tap Hole Clay mass to reduce emission

FY 22-23





Thank You

